

From its very beginning, COSATI turned out to be a dynamic, ever-changing organization, reflecting the changes that were taking place during its lifetime. It is acknowledged that Jerry Wiesner is credited for bringing the Committee on Science Information into being, but most of what happened during the next few years to cause it to blossom took place during the regime of the next Science Advisor, Donald F. Hornig, who held this post for about five years, from January 1964 to December 1968. Only a month or so after he came to the Office of Science and Technology, there was an exchange of correspondence between Hornig and Leland Haworth, NSF Director.

Haworth wrote to Hornig on February 13, 1964, calling for a statement on the roles of OST and NSF in the Federal and private activities in scientific information. Haworth recognized that each Federal agency has the responsibility of assuring that adequate STI services are available to support its R&D activities. He further recognized that several agencies have specialized roles in the nationwide dissemination of STI in support of their missions. For these reasons he stated: ¹

I agree with the recommendation of COSI that, under the reorganization Act No. 2, OST should provide leadership in effecting cooperation and coordination among Federal agencies with respect to their STI activities. The NSF will...assist OST in those areas where the Foundation has particular responsibilities.

He outlined the Foundation responsibilities to include:

Providing leadership in effecting cooperation and coordination among non-Federal STI services and organizations toward the end of developing adequate systems for the collection, organization and dissemination of information. Developing adequate relationships between Federal and non-Federal scientific activities. (Performing) these functions under the coordinating purview of OST just as are STI activities of all other Executive Branch agencies.

He agreed that COSATI, FCST, would be the mechanism for discussion, review and recommendations on such activities to FCST and to the Science Advisor, and concluded with a request that if Hornig agreed, NSF should be appropriately informed. A response to Haworth was rapid.²

¹ Unpublished letter from Leland J. Haworth, Director, National Science Foundation, to Donald F. Hornig, Director, OST, February 13, 1964.

² Unpublished letter from Donald F. Hornig, Director, OST to Leland J. Haworth

I appreciate receiving your letter of February 13 regarding the role of NSF in the governmental complex of scientific information activities. I fully concur with your views and support the concept that the NSF shall provide leadership in effecting cooperation and coordination among non-Federal STI services and organizations, and in developing adequate relationships between Federal and non-Federal scientific activities. OST, with the assistance of FCST shall provide overall leadership of all Federal STI activities...in accordance with Reorganization Act No. 2 which mentions the following responsibilities of OST: (1) major policies, plans, and programs of the various agencies; (2) assessment of selected developments and programs; (3) review, integration, and coordination of major Federal activities in science and technology, giving due consideration to the effects of such activities on non-Federal resources and institutions; and (4) assuring that good and close relations exist with the Nation's scientific and engineering communities. With the clarification of roles, the staff of OST, COSATI, and the staff of the NSF, are in a far stronger position to develop and gain interagency concurrence on information programs...I believe that the clarification in responsibilities represented by this exchange of letters may help make those actions a reality.

It should be borne in mind that Don Hornig was appointed to the post of Science Advisor not long after the assassination of President John Kennedy. Jerry Wiesner had decided to return to his post at MIT and Hornig was appointed to take his place by President Kennedy, not President Johnson. It was uncertain how the new President would employ the Office of Science and Technology and his Science Advisor. One example of the doubt that existed at that time is found in an article in Science¹:

During the first 6 or so months of Hornig's term, the President and the White House inner circle had an unclear notion of how they might employ OST, and there were some matters involving science and technology where the politicians were acting without talking to OST. Such a case occurred when Johnson dedicated the new National Geographic Society headquarters building, and proclaimed -- to the astonishment of OST and the horror of the Society -- that the Society should become the coordinator for a great international program of scientific cooperation. Nothing further has been heard of the idea.

There is no question about Hornig's contributions in fulfilling Wiesner's promises to Senator Humphrey in the STI area. One of his first decisions was to shift the focus of the Federal STI program directly to his own office. William T. Knox, the Director of Planning at Esso Research and Engineering Company, who was a member of the Weinberg Panel on Science Information, the group that turned out the PSAC report,

¹ D.S.G., LBJ and Hornig: Close Ties Exist as Science Adviser Starts Third Year, SCIENCE, American Association for the Advancement of Science, 28 January 1966, p. 431

Science, Government and Information, discussed in the first chapter, became the Chairman of COSATI, vice General William J. Ely. Knox became a member of the OST staff in the Old Executive Office Building adjacent to the White House. Colonel Andrew A. Aines was detailed to the staff of the Office of Science and Technology as a Technical Assistant and Executive Secretary of COSATI.

But it should be acknowledged that Jerry Wiesner, a man of great energy and talent, had prepared the foundation for the burst of energy that COSATI brought on the scene. This is seen in the first official report of COSI, a 1963 report on STI in the Federal Government.¹ The Foreword of the report was prepared by Wiesner, whose involvement and vision, are clearly revealed. In itself, it is a key document whose lustre has not been dimmed by time:

With science and technology emerging as important instruments of policy, the manner in which this nation fosters creative research and development is one of the major issues for executive and legislative decisions today. Science and technology not only contribute very significantly to our military security, but also manifest a profound influence on the vigor of our domestic economy, and on the improvement of the health of the nation. While the fruits of science and technology have been significant, they also have imposed an unprecedented demand on our nation's resources. The broad range of opportunities has resulted in the present great competition for these funds, and possibly even more important, for scarce manpower as well.

Because federal funding for R&D now accounts for approximately 65% of the national R&D effort, and because manpower resources are inevitably in short supply, increasing attention must be given not only to what R&D programs are undertaken but also to how these programs are conducted. Therefore, to assure a minimum of both gaps and redundancies, all echelons of R&D management require information about research.

The communication of scientific results is thus critical to the achievement of high-quality scientific endeavor and prompt and efficient conversion of results to technology. The report which follows is concerned with the nature of this communication problem and includes the Executive Branch view toward the policies, plans, and practices related to achieving an adequate flow of information...

¹ Committee on Scientific Information, Federal Council for Science and Technology, Status Report on Scientific and Technical Information in the Federal Government, prepared in the Office of the Secretary of Defense, Washington, D.C., June 18, 1963, pp 18.

2.3 Wiesner made it plain that it is imperative for the country to understand the importance of a national science and technology policy and the necessity of developing such a policy to contribute to national security and economic viability. He also relates the need of such an overall policy to the area of national science communications, which also requires matching policies, plans and practices. He goes on to point out:

As science and technology have grown so has the volume of communication and the complexity of communication channels. Existing techniques for communication have been severely strained. Moreover, many of our social customs, such as the use of published papers as a measure of professional attainment, increase the volume of information generated and reduce the effectiveness of the communication channels. Oral communication, being more flexible and benefiting by modern advances in voice communication and transportation, has been given a proportionately greater burden of scientific and technical communications. The flow of the scientific literature has been experiencing greater stresses as a medium of communication.

Science has outgrown its organization along well-delineated disciplines of the past. The lines of demarcation are now much hazier, and new disciplines have appeared at the interfaces of the older disciplines. Whereas in the past, scientific communications remained within each discipline, there are now demands for information to be translated and extracted for use by other disciplines and by the technologies. These new and different burdens are being placed upon the scientists, engineers, and upon the documentalists to insure the viability of communication systems for R&D...

The Federal governments interest in STI has grown during the past several years in response to the increasing difficulty of scientific communication. In 1958, a panel of the the President's Science Advisory Committee (PSAC) examined science information activities. The Senate Government Operations Committee and its Subcommittee on Reorganization and International Organizations, have intensively examined the federal role and the federal programs. During 1962, a second panel of PSAC undertook yet a further examination of the nature of information problems, and there findings were set forth in a report released by the President in January 1963. The work of this panel was significantly assisted by a full-time task force which studied the organization aspects of scientific communications of the federal agencies.

The importance of an effective science information program is, in fact, reflected in the review and the continuing study which this problem is receiving within the Executive Office of the President. Because scientific information and the processes of communication are an intrinsic part of R&D, the Executive Branch recognizes that its sponsorship of research carries a collateral obligation to assure that fruits of such research are made part of the common pool of knowledge. The Executive Branch recognizes the essentiality of good communications to the prudent management of the government's R&D programs. The Federal gov-

ernment also recognizes its obligation to make sure that the results from research are equally accessible to individual scientists and engineers, to industrial enterprises, and to other non-government institutions...

The foregoing is as forthright a statement of policy vis-a-vis the responsibility of the Federal government to disseminate the information generated during its R&D programs to be made "part of the common pool of knowledge" as has been made at any time. It is in sharp contrast to what appears to be the policy of the present Administration. Wiesner was also aware of the importance of the private information sector in the scheme of things, even though the focus at that time was on the not-for-profit professional societies, rather than the emerging commercial vendors of STI products that are on the scene today. On this subject he pointed out:

{The} danger in upsetting the competitive balances of private and professional information services and publications by any of the several activities of the government is acknowledged. The Executive Branch is aware of how quickly its influence is felt in the private economy....There is clear recognition that research conducted for the solution of one problem is frequently employed in unexpected ways for the solution of other problems. In the process of conducting research in defense or exploration of outer space, we develop an enormous reservoir of scientific information. And it is from this reservoir that we have grown to expect important contributions to be made in our civilian technology, to that part of our economy which must compete in the world market with superior goods and services.

It is essential that the agency programs- operating with different missions - advance with a minimum of undesirable duplication and with a maximum of cross-agency stimulation. Thus information must be exchanged between agencies about research in prospect so that each may plan in the full knowledge of others' intentions. Providing the necessary management tools to facilitate effective communication is an essential part of the information process. Scientific intelligence, i.e., information about who is doing what, where, and with what funds, can be used by each agency and by the Executive Office, and by Congress, to map out the current R&D effort of the whole government, and in some cases of the whole nation. It can be employed to determine where emphasis is currently being placed, where gaps or imbalances exist, and how available talent is being employed, and whether appropriations and priorities are keyed to the national objectives.

It is difficult to understand the indifference shown in the last few years about the lack of strong mechanisms to deliver information to Federal R&D agencies about R&D projects that are ongoing, even though this seems a wise course of action to take. It is also difficult to understand why the systems that were developed to carry on

this function have been allowed to wither. It comes as no surprise that the Grace Panel (President's Private Sector Survey on Cost Control Task Force) reviewing Federal R&D called for the re-establishment of a central function in the Federal government along the lines of the now defunct Smithsonian Science Information Exchange in late 1983. It might also be a surprise to Jerry Wiesner that the majority of Federal STI managers have little to do with this phase of science communications.

Returning to the Foreword, Wiesner states:

With this perspective, the federal government and its constituent agencies are developing principles for an effective science information system and an articulation between components that will focus activities for a common purpose. In this regard, we have adopted the view that it is both unwise and impracticable to concentrate all of the science information activities in a single agency.

Wiesner goes on to amplify this statement with:

Steps have been taken, however, to identify a focal point of responsibility in each agency for the development of plans and programs within the agency consistent with the overall objectives. A second step has been taken to coordinate elements of the government-wide system through a Committee on Scientific Information of the Federal Council for Science and Technology. Also, in recognition of the interplay between the federal and non-federal entities, the Committee on Scientific Information and the Office of Science and Technology will continue to look to outside consultants so that problems involving private institutions and individuals will gain careful consideration in the development of federal policies.

To underscore the concern of his office, Wiesner concludes:

Finally a number of policy steps of importance have been taken regarding the use of science information both as an element of R&D and as a management tool. These are summarized in the early part of the report that follows. Also as a step toward improving this federal system, it has been necessary to take stock of the various science information activities of the Federal agencies. This report represents such an inventory and is being made available to provide a better understanding within and without the government of the problems of scientific and technical communication and remedial actions being undertaken.

With this lucid statement of the problem and the steps being undertaken to solve the problem within the agencies with the help of the Executive Office of the President as a backdrop, here are some of the highlights of the 1963 Report:

Each Federal Department or Agency with a significant STI activity has established a focal point of responsibility.

The Federal Department or Agency focal points have been constituted as the Committee on Scientific Information of the President's Federal Council for Science and Technology. As such, they are a mechanisms for inter-agency coordination and development of Government-wide standards and with the objective of developing an ar-

With the advice and concurrence of the Federal Council, the proposal for a National Standard Reference Data System has been adopted to provide scientists and engineers with critically evaluated numerical data in the physical and engineering sciences necessary for the R&D process to be operated by the National Bureau of Standards, Department of Commerce.

The Science Information Exchange is extending its coverage on research tasks to include the physical sciences. The fiscal and managerial responsibility for SIE will be transferred to the National Science Foundation.

COSI is working toward the adoption of several measures to speed up and simplify the interagency processing of reports, such as a standard photographic form for document storage and interchangeable indexing procedures.

The Library of Congress and the National Science Foundation have established the National Referral Center for Science and Technology, whose function it is to direct any scientist or research organization to the source of information including specialized information centers.

Since information is a part of research, the Federal Government has assumed responsibilities toward private and professional information systems which are interwoven with its own in the total U.S. science communication system.

The report goes into detail about gains in individual Federal agency STI programs. Some of the progress made will be reported in other parts of this book devoted to the individual Federal agency STI programs.

The first chairman of the Committee on Science Information was Dr. Brockway McMillan, then Assistant Secretary of the Air Force for Research and Development. In only a matter of a few months, he was replaced by Vice Admiral Charles B. Martell, USN, who was at that time the Deputy Director of Defense Research and Engineering for Administration and Management in the Office of the Secretary of Defense. The shift was probably a sign of the increasing interest in the field of STI by the Secretary of Defense and the Executive Office of the President. It was also a matter of happenstance that the Executive Secretary of the Federal Council for Science and Technology was Dr. Edward Wenk, Jr., who will be remembered as a consultant to Senator Hubert H. Humphrey during the period the Senator was holding hearings on Federal STI. Wenk's contributions to improved Federal STI programs started in the 1950s and are covered in the first chapter. Arriving in FCST, he was quite familiar with the Federal government STI issue and acted vigorously and effectively to achieve the kind of action that was taking place in late 1963 and early 1964. Credit needs to be given to Ms. Donna Spiegler, a staff member of the first

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Director of Technical Information in the Office of the Secretary of Defense, Mr. Walter M. Carlson, who was drafted for the post from private industry. Spiegler was the first secretary of the Committee on Scientific Information, working on a part-time basis. The 1963 COSI Status Report was prepared largely under her ministration. When COSI became the Committee on Scientific and Technical Information the next year, / ^{Martell} was replaced by Lt. General William J. Ely, U.S.A., who had become the new Deputy Director of Defense Research and Engineering for Administration and Management, Office of the Secretary of Defense. as well as chairman of COSATI. When Ely took over the responsibility of COSATI he asked that the Director of Army Technical Information, Colonel Andrew A. Aines, who was the architect of that program, to be reassigned as Executive Secretary of COSATI on a full-time basis.

For historical purposes, a list of the first Federal agency focal points appointed in the late 1950s and early 1960s is appended. The COSATI ear had begun.

FEDERAL AGENCY FOCAL POINTS FOR SCIENTIFIC AND TECHNICAL INFORMATION

<u>Department or Agency</u>	<u>Focal Point</u>
Atomic Energy Commission	Mr. Edward J. Brunenkant, Director, Division of Technical Information
Bureau of the Budget	Mr. J. Lee Westrate, Office of Management and Organization
Department of Agriculture	Mr. Foster E. Mohrhardt, Director, National Agricultural Library
	Dr. Harold C. Knoblauch, Deputy Administrator, Cooperative State Experiment Station Service (Alternate)
Department of Commerce	Dr. Donald Schon, Director, Office of Technical Services
	Dr. William Eaton, Deputy Assistant Secretary for Science and Technology
Department of Defense	Mr. Walter M. Carlson, Director of Technical Information
	Dr. Robert Stegmaier, Office of the Director of Defense Research & Engineering (Alternate)
Department of the Army	Colonel Andrew A. Aines, Director of Technical Information
Department of the Navy	Dr. M. H. Schrenk, Research Coordi- nator, Office of Naval Research
Department of the Air Force	Mr. Edward Grimes, Program Man- ager, Scientific & Technical Information
Advanced Research Projects Agency	Mr. Fred Koether, Technical Informa- tion Officer
Department of Health, Education, & Welfare	Dr. William H. Stewart, Assistant to the Special Assistant to the Secretary (Health and Medical Affairs)
Public Health Service	Dr. F. E. Kelsey, Special Assistant to The Surgeon General (Alternate)
National Institutes of Health	Mr. Thomas Kennedy, Special Assist- ant to the Director, NIH
Food & Drug Administration	Mr. Oral Kline, Assistant Commis- sioner for Science

<u>Department or Agency</u>	<u>Focal Point</u>
Department of Interior	Mr. H. H. Eckles, Assistant to the Science Advisor
	Mr. Leslie W. Scattergood, Chief, Branch of Reports, Bureau of Commercial Fisheries (Alternate)
Department of State	Colonel William R. Sturges, Science Officer, Office of International Scientific Affairs
Federal Aviation Agency	Mr. Don W. Dunn, Chief, Technical Information Division, Systems Research & Development Service
National Aeronautics & Space Administration	Mr. Melvin Day, Director, Office of Scientific & Technical Information
National Science Foundation	Dr. Burton W. Adkinson, Head, Office of Science Information Service
Office of Science & Technology	Dr. J. Hilary Kelley
Veterans Administration	Dr. M. James Musser, M.D., Assist- ant Chief Medical Director for Research & Education in Medicine
	Dr. Lyndon E. Lee, Jr., Associate Director, Research Services

On 14 November 1963, the Committee on Scientific Information (COSI) made a presentation to its parent body, the Federal Council for Science and Technology, on some of the important issues in the handling of scientific and technical information. Dr. Hornig, the Chairman of FCST asked that COSAI examine the problem areas in more detail and report to the Federal Council in January 1964 with recommendations for actions. This was done and a summary report was filed accordingly.¹ The first part of the report listed three Federal Responsibilities for all agencies involved with STI programs. Firstly, each agency (including some in the Legislative Branch) must organize and maintain efficient STI systems to serve their missions and user publics. Secondly, technical agencies are responsible for coordinating and maintaining effective interagency STI programs. Thirdly, each agency is responsible to the public for insuring a proper flow of STI between the government and all interested components of the American economy. The second part of the report dealt with Federal problems. The first of these involved coordination, the need to fix the responsibilities of the Department of Commerce and its clearinghouse for STI, the National Science Foundation and its responsibilities laid down in its legislation to foster the interchange of scientific information domestically and internationally, and the Office of Science and Technology to provide for coordination, review and integration of Federal STI programs as laid down in the President's Message, March 27, 1962, on Reorganization Plan No. 2 of 1962. A COSI task group identified 23 additional statutes assigning responsibilities in the STI area to eight agencies. The interchange of letters between NSF and OST reported on earlier clarified the responsibilities of these two key agencies.

The third part of the report dealt with the need for conspicuity so that all managers and others involved in Federal R&D programs would be aware of what was happening in the STI area throughout the Federal government and the need to cooperate.

The fourth part deals with the need to obtain proper identification of funds for STI efforts in the agencies. These funds were usually not line items that could easily be

¹ Committee on Scientific Information, Federal Council for Science and Technology, Summary Report on Scientific and Technical Information, Washington, D.C., 14 Nov. 1963. (Unpublished), pp 10.

Other problem areas included: the need for better definitions for STI activities, increased knowledge of user needs, development of a technological base, i.e., management of R&D in information sciences and the use of new information technology, and the need for education and training in the management and use of information technology, more effective use of information resources, and improvement of technical writing.

The problem of coordination was discussed and the advantages and disadvantages of a national system, a Federal system and an Executive Agency system were developed.

The report concluded with eight recommendations for FCST action: 1/ A proposed charter that would expand COSI to COSATI, i.e., technical information would henceforth be linked to scientific information. 2/ Government Leadership. FCST should confirm that STI leadership rests with the Office of Science and Technology, rather than with NSF. 3/ The Federal Council endorse the newly-developed concept of a clearinghouse of Federal STI to be operated by the Department of Commerce in accordance with Public Law 776. 4/ Budget. The Federal Council should ask the Bureau of the Budget to work with COSATI to develop a uniform budget structure for STI activities. 5/ Agency Efforts. The Federal Council should call on each agency of the Executive Branch to continue and accelerate its own efforts toward effective technical information programs serving scientists, engineers, technologists, and technical management, and to cooperate in the development and operation of a coordinated system. 6/ Incentives. The Federal Council should ask the Civil Service Commission to give highest priority to a review of salary classifications and schedules of scientists, engineers and others engaged in the handling of STI. 7/ National Systems. The Federal Council defer action on development of a national plan or a single system for government agencies until proper studies are undertaken. 8/ The assignment of leadership responsibility within the Executive Branch to OST would require a new Executive Order. It is recommended that FCST endorse prompt preparation and issuance of an Executive Order to make this assignment. (The Charter of COSATI prepared by COSI is attached.)

Attachment 1

FEDERAL COUNCIL FOR SCIENCE & TECHNOLOGY

CHARTER

COMMITTEE ON SCIENTIFIC AND TECHNICAL INFORMATION

The Committee on Scientific and Technical Information (COSATI) is a committee of the Federal Council for Science and Technology. The primary objective of COSATI is the development among the Executive agencies, of a coordinated, but decentralized scientific and technical information system for scientists, engineers, and other technical professions. As a secondary objective COSATI will be concerned with coordination and cooperation with improved Federal and National systems for handling scientific and technical information.

COSATI will, within the priorities indicated by the above objectives, carry out the following activities pertaining to scientific and technical information:

1. Identify the problems and requirements;
2. Review the adequacy and scope of present programs;
3. Devise or review new programs and other measures to meet the requirements and solve the problems;
4. Recommend standards, methodology, and systems for uniform adoption by the Executive agencies;
5. Identify and recommend assignments of responsibility among the Executive agencies;
6. Review and make recommendations concerning the resources assigned to the programs of the Executive agencies;
7. Recommend management policies to improve the quality and vigor of the information activities;
8. Generally facilitate interagency coordination at management levels.

Appropriate provision will be made for the Committee to include in its deliberations both technical and operational personnel conversant with technical information requirements and problems of scientists and engineers. The Committee will be assisted as needed by task groups and panels of personnel selected from inside and outside the Federal Government. It will coordinate its efforts with other committees and groups whose programs may affect scientific and technical information.

The Summary Report, which was signed out by General Ely in January 1964, contains other valuable information as follows:

- Supplement No. 1 (Revised), Clearinghouse for Federal Scientific and Technical Information. Contains recommendations for actions and specific functions. It also contains an outline summary of eight independently developed plans or proposals relating to government-generated STI.
- Supplement No. 2. Outline Scope of Activities of COSATI. This is a three-page outline, dealing with standards and requirements, organization and responsibilities, external relationships, and administrative support.
- Supplement No. 3. Glossary of Fifty Definitions of STI (7 pages)
- Supplement No. 4. National Referral Center for Science and Technology Report on Inventory Program and Referral Services. The inventory referred to deals with inventories of information sources. It reviews some of the data collected by the National Referral Center for Science and Technology, Library of Congress.
- Supplement No. 5. Media Used for Scientific and Technical Communications. This supplement contains a discussion of the various media used to store and transmit STI. It discusses on-line technical communications, identifying conventions, symposia and other technical meetings, telephone, closed-circuit TV and direct communication between computers. Also discussed are off-line technical communications, such as journal articles, written reports, informal reports, patent disclosures, training manuals, textbooks, and some others.
- Supplement No. 6. Executive Agency Responsibilities for STI. This is a very valuable list of public laws and executive orders that require the Federal agencies to disseminate STI to the public.

Included in the Summary Report are excerpts from The Federal Council of interest:

- May 28, 1963: Speaking for the Council, Dr. Wiesner warmly commended Admiral Martell and COSI for their accomplishments, assured them of support for actions taken by the Council and encouraged COSI to continue to develop compatibility techniques.
- November 14, 1963: Dr. Wiesner noted that COSI had only partly responded to recommendations by the Weinberg and Crawford Panels and that the opposition encountered, for example in assessing a delegated agent concept, could perhaps be ameliorated if these issues were brought to the Council for discussion. In summary, the Council told COSI to bring its recommendations to the Council without necessarily developing consensus.

A reading of the COSI Summary Report reveals that the COSI organization undertook its tasks with intelligence and gusto.

The involvement of Wiesner in 'STI' affairs is further noted in a letter sent to NSF in mid-1963.¹ The problem was how to get the Science Information Exchange efforts expanded and how to provide it with funding to assist. The gist of the letter was that NSF would take on the responsibility for management and funding SIE; that SIE would continue to cover current research in biological and physical sciences; that the Federal agencies currently providing support to SIE would transfer FY 1964 funds to NSF; that NSF would be responsible for funding in future years without contributions from the agencies; that the Governing Board of SIE would become an NSF advisory group and its membership would be expanded to include representatives from the Departments of State, Interior, Commerce and Agriculture; and finally, SIE's charter would be revised by NSF and it would provide COSI with recommendations for vigorous administrative action to ensure proper technical inputs by all Federal agencies in the physical sciences area.

Another example of the involvement of Wiesner and the members of the Federal Council in Federal STI affairs is revealed in a letter sent by the former to the latter group on June 5, 1963 that helped get the National Standard Reference Data System started.² The substance of the letter was that there was now an agreed-upon policy for the program. The National Bureau of Standards would be responsible for the NSRDS and would set up a Center for the purpose. Other agencies would put up \$800,000 in FY1964 to bring its budget up to \$1.8 million for that year. Thereafter, the Department of Commerce would be responsible for the budget. Finally, NBS would prepare a detailed plan for administration of NSRDS for submission to COSI for review and recommendation by the Federal Council. On the 23rd of August 1963, a step was taken by FCST that contributed in a major way to the solvency of nongovernment, scientific publishing. when it agreed that the proposed Federal policy on government support of nongovernmental publications (page charges) be adopted for government-wide application. In subsequent years, when the cost of publishing scientific journals increased because of inflation and proliferation of candidate

¹ Letter from Dr. J.B. Wiesner, OST, to Dr. A.T. Waterman, dated 6 June 1963, informing the National Science Foundation about certain decisions of the Federal Council for Science and Technology.

² Letter from Dr. J.B. Wiesner, OST, to the members of FCST, dated 5 June 1963, on the implementation of the National Standard Reference Data System.

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articles by an increasing population of scientists, this enlightened action by the Federal government almost by itself proved the value of the information efforts of the Federal government in the eyes of many scientists and engineers. With the existence of a COSI such a contribution was possible. If a similar problem arose today, there would be no organization knowledgeable enough or authoritative enough to develop the consensus required.

There was another development during the Wiesner period that stemmed from the PSAC (Weinberg) Report (1963). After warning the Federal agencies not "to swamp non-Government (information) activities" and that "support by Government does not necessarily mean domination by Government," the Weinberg Report stated, as its first recommendation:

Each Federal agency concerned with science and technology must accept its responsibility for information activities in fields that are relevant to its mission. Each agency must devote an appreciable fraction of its talent and other resources to support of information activities. (p.4)

This is explained further:

Since the information process is part of the R&D process, agencies that support R&D in fields that are relevant to their missions accept responsibility for supporting and otherwise carrying out information activities in these fields. Each of the mission-oriented agencies ought to become "delegated agents" for information in fields that lie within their missions. In these fields the agencies should maintain a strong internal information system and should support non-Government information activities, always striving to blend the Government and non-Government systems into a consistent whole.

For those involved with science communications two decades later, when this book is being written, wondering why the PSAC panel would come up with a notion like the "delegated agent" responsibility, it should be pointed out that the non-governmental sector that Weinberg and his colleagues were showing concern for was the professional society publishers involved in science communications. There were some science publishers in the commercial sector at that time, of course, but they were not the group in focus. The publishing endeavors of the professional societies in the disciplines were just beginning to feel the effects of the proliferation of scientists and their literary output in each of their fields and they were beginning to recognize that their economic base was inadequate to new demands. Correspondingly, the Federal agencies were aware

¹ Weinberg, Alvin (et al), Science, Government, and Information, the Responsibilities of the Technical Community and the Government in the Transfer of Information, A Report of The President's Science Advisory Committee, The White House, Washington, D.C., January 1963, pp. 52

that the sudden infusion of large amounts of Federal R&D funds into Federal and non-government science and technology was a prime cause of the increasing proliferation of STI. It acted very responsibly when it established the "page charge" convention that eased the publishing problem of the scientific societies. The Weinberg Panel obviously did not think that it was, hence the concept of the "delegated agent."

The Committee on Scientific Information, then under Brockway McMillan, was in the process of shifting to a new chairman, Vice Admiral Charles B. Martell, USN, in the Office of the Secretary of Defense. They called upon Dr. Andrew D. Suttle, Jr., a member of the staff of the Director of Defense Research and Engineering, and his task force, which also included Joseph G. Gratton, AEC, Thomas Kennedy, NIH, and Frank Naughten, NSF, to study the concept of the "delegated agent." The Task Force reported back on 16 July 1963 as one of the first products of COSI.¹

As its first step the task force requested nine agencies which performed over 98 percent of Federal R&D at that time for their statutory and other authority for their agency STI programs. Appendix I shows the results, including a list of the pertaining public laws. After studying these, the Suttle panel concluded that:

(D)illigent pursuit of the field of information processing and dissemination is coextensive with and an integral part of any well-executed R&D program.

There is ample justification for further study of the handling of STI to develop the most efficient method of disseminating and utilizing it.

The different missions of the various agencies and the history and philosophy which is found in various scientific and engineering disciplines suggest that different types of information systems will best serve the individual needs of the several groups.

The concept of the "delegated agent" is not universally applicable to our information systems in the Federal Government and we recommend instead intensive work within the agencies and departments to develop systems which best meet their needs. Our finding does not preclude its application at some future time.

The Federal agencies must indeed face up to their responsibilities with respect to ...traditional private and mixed systems which are used for the exchange of new scientific information developed out of Federally sponsored R&D efforts. To this end the Task Force endorses the general

¹ Suttle, Andrew D., Jr, et al, Report on the Concept of the Delegated Agent, Committee on Scientific Information, Federal Council for Science and Technology, PP. 10, plus two appendices., 16 July 1963. (unpublished)

principle that the Federal agencies should assume responsibility for guaranteeing the viability of science information services by indirect support through grants, contracts, and other mechanisms in those areas of science and technology in which the Federal agencies have a direct interest, and in which an AEC-NASA style of operation is inappropriate or not feasible.

The Suttle study was very seriously undertaken. The notion of a Federal agency becoming a delegated agent in a particular information field was an invention that the panel found troubling. It asked how the programs of the various agencies can be defined and classified in such a way as to identify agencies which have a monopoly or preponderance of investment in a given field of science, which would therefore be logical choices "to accept responsibility for supporting information services in those fields." If it could be done, it would be true that operators of non-government systems would know which agency to "importune" for help when it was needed, but it would also mean that the Federal agencies would set forth criteria for support and guidelines for inter-system compatibility. Also perplexing was how to design a mechanism to insure that the responsible agency would have the fiscal resources to provide that support. What the Suttle task force did in its objective review of all of the problems and issues that were still unanswered was useful. It called on each Federal agency to become a "dedicated agent" now to improve its own information system. It pointed out that the system of communication operated by the learned societies had less of a pressing need than the engineering community, which, it felt, needed more help. The Task Force, in essence, disagreed with the Weinberg Panel, claiming that there is a need for improvement, but that it "does not view the present systems with too grave alarm."

Of more than passing interest is the recognition that the Office of Science Information Service, National Science Foundation, had in a similar circumstance, when it was directed by statute to create and operate what was, in effect, a national scientific and technical information service. What NSF saw, at the time it was a small, new agency, was a number of growing Federal R&D programs and a number of traditional learned society publication systems in being, though comparatively small compared to what they would be in the next few years. How could it intervene to replace or even monitor these information systems? OSIS, wisely, chose to provide assistance in the learned publication

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field and avoid taking over control and operations of these programs. With the issuance of the Weinberg Report, which as previously mentioned, commanded virtually worldwide attention, a report which was prepared by scientists rather than information experts, each one of its recommendations carefully crafted, the call for "delegated agents" it made could not be met with silence. The Suttle Report was like a dash of cold, icy water when it was handed to the Science Advisor's office, flushed with pleasure with the vision and optimism of the Weinberg Panel. At first glance, the Suttle Report threw up an impenetrable road block, but it provided a short detour to the intent of the PSAC report in an appendix (Appendix II) at the end of the Study, entitled: "Characteristics of a Responsible Federal Agency Science Information System." (underlining added) It included a definition of a Federal "responsible" agent, how it would function, and its method of operation. The Weinberg Report talked about the responsibility of the Federal government to participate in a leading way in national science communications by establishing delegated agents. The Suttle Report tempered and rationalized the recommendation and introduced the notion of responsible agents. COSATI was to use both terms in the future together, responsible and delegated agents, when it created a new panel on National Systems for Scientific and Technical Information.

But let us go back in history to see how things were sorted out, what actually happened when the Suttle task force turned in the report.

Suttle wrote a memorandum to his task force,¹ stating that he saw four conclusions resulting from the work. 1/ ...the concept is neither useful nor viable. 2/ ...the concept as modified (by his group) might be useful in the Federal organization. 3/ The scientific community as differentiated from the technical and engineering, are well served by their present system and do not require and would, in fact, suffer from modification. 4/ The needs of the mission-oriented agencies and departments and the technical and engineering disciplines are in dire need of expanded and improved information

¹ Suttle, A.D., Jr. Memorandum for Delegated Agent Task Force, Subject: Principal Points Derived from Study, dated 27 June 1963, (DOD stationery) 1 page, unpublished.

systems. In addition...it is doubtful if one method or procedure which is manageable and practical can be designed to serve the needs of the two elements identified above.

In response, Martell responded,¹

Speaking for COSI, we were pleased to accept the Task Force final report... Your findings and recommendations were discussed by the full committee on 17 July 1963. The Committee generally concurs with the recommendations. However, we feel that no useful purpose would be served by further intensive study of the "delegated agent" concept at this time. It is possible that the concept may find application in the future, pending the successful completion of COSI's major objective--a complete understanding and identification of the total national program in STI....

Martell promptly wrote a letter to Dr. Wiesner, FCST Chairman, in which he said in summary:²

...The Task Force concluded that it might be possible to assign responsibility for information programs to specific agencies in some cases but, in general, that this was not practicable. They further recommend a concentrated study in fine detail be undertaken to identify the program interests of the many Federal agencies engaged in R&D. COSI believes their effort adds to the background of information...However, we feel that until such time as a more complete understanding and identification of the total national program in STI can be obtained, further study of such responsibilities would not be fruitful...The Committee unanimously concludes: a. that the delegated agent concept be retained as a philosophic background for affecting future management decisions. b. at such time as executive or legislative action is taken to assign R&D responsibilities for specific areas to Federal agencies, a concurrent responsibility be assigned for scientific information in this area. c. No useful purpose would be served by further study of the "delegated agent" concept at this time. The letter also stated that this was Martell's last action as the Chairman of COSI.

There is yet a third letter, this one to Wiesner from Weinberg.³ In it, Weinberg makes clear how he felt about the drift of the Suttle Report. After reading it, he wrote:

I have decided to agree with most of the conclusions of the Task Force. The Task Force agrees with PSAC that delegated agents for information in certain fields are desirable and it urges that OST identify the fields of science for which delegated agents are appropriate....OST should move vigorously to identify the fields, starting with water resources and oceanography, which are relatively well-defined. An appropriate agency could be found to take on the job of being godfather for information in each of these fields. If the delegated agent idea works in a few fields, other fields can ultimately given the same treatment.

In a reflective mood, Weinberg pointed out that the delegated agency in a way was the central organizational recommendation in his panel's report. The Baker Report resulted in setting up NSF's Office of Science Information Services. Weinberg's panel believed

¹ Martell, Charles B, to Andrew D. Suttle (FCST stationery), July 18, 1963, 1 page.

² Martell to Jerome B. Wiesner, Director, OST, Executive Office Bldg., Washington, D.C., July 19, 1963, 2 pages.

³ Weinberg, Alvin M. to Dr. Jerome B. Wiesner, White House, dated August 6, 1963,

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that OSIS would be better if it could be made more responsive to the views of the working scientific community rather than those in the information community. Weinberg added:

Not knowing how to change OSIS itself, we decided to recommend little OSIS's in each agency that were responsive to the views of the working scientists in various fields. ...These little OSIS's would be the instruments by which the delegated agents would operate. What was not handled by the delegated agents would be handled by NSF's OSIS. I would be most unhappy if this central idea of the panel report is quietly buried simply because delegation of responsibility for information in a field to one agency may reduce another agency's responsibility for information in that field.

He added, in a spirited way:

I admit the idea goes counter to the time-honored government principle, "Never stop doing something just because there is a better way to get it done, if the other way involves a different agency", but I thought that overcoming this attitude was what the Committee on Science Information was set up for.

In a postscript, Weinberg became even more exercised, saying:

I wrote the above before seeing Martell's letter reporting the results of the delegated agent task force. Rec. (c) in Martell's letter, "That at such time as executive or legislative action is taken to assign R&D responsibility for specific action to a specific Federal agency, a concurrent responsibility should be assigned for scientific information in this area.", defeats the entire purpose of the delegated agent concept. Multiple support of research, on the whole, is not a bad thing--at least this is what we now seem to believe. Multiple and overlapping information systems covering the same material are, by contrast, a bad thing. The delegated agent idea was invented to try to preserve multiple support of research on one hand yet rationalize the handling of information that comes from that research. To defer doing anything about the delegated agent in a field until all of government research in that field is reorganized is equivalent to killing the whole idea.

Not too long after this exchange of letters, Martell was replaced by Lt. General Ely. Jerry Wiesner was drawing close to the end of his assignment as Science Advisor. The Executive Secretary of FCST, Dr. Ed Wenk, Jr., was going to be replaced by Dr. Charles Kidd. Wiesner's successor, Dr. Donald Hornig from Princeton University was on his way to the Executive Office of the President to become Science Advisor. With all of these changes going on or in prospect, the delegated agent issue was temporarily set aside. The Weinberg Report continued to get attention, however. In the Executive Office of the President, during a meeting held with David Z. Beckler, one of the Science Advisor's top assistants, Beckler encouraged the preparation of a paper that would do for the international sector, what the Weinberg (PSAC) Report did for the domestic sector. Dr. Jay Kelley agreed, suggesting that bibliographic control might be allocated to different countries acting as delegated agents in specific fields. There is no evidence that this

The actions and the outlook of COSATI are registered in a summary progress report that appeared in the Fall of 1964.¹ The major COSATI activities mentioned include a two meeting discussion in January and February of Federal responsibilities and problems in the STI area.

The growth of R&D programs in the government and the related growth of STI programs in individual agencies requires top level coordination.

Concern of scientists and engineers everywhere is producing demands for high-level government attention.

The level of congressional interest in this important area is rising rapidly.

The handling of STI is becoming recognized as an integral part of R&D and related technical activities. The steps to be taken by the government are a matter of importance not only to the scientist, the engineers and the technical manager, but to everyone.

Three basic responsibilities for government action were spelled out:

Federal R&D agencies and certain components of the Legislative Branch are responsible for organizing and operating efficient STI systems to serve their missions and user publics.

Technically-oriented agencies or combinations of them have the responsibility for coordinating and maintaining effective interagency STI programs for their mutual benefit and in the interest of the greater economy.

All agencies in the two branches have the responsibility to the public at large - the taxpayer - for insuring a proper flow of STI between the government and all interested components of the American economy.

A number of actions were approved by the Federal Council, including a new COSATI charter defining its scope more clearly and to include engineering information activities along with scientific activities. COSATI problems will receive first priority, and secondarily COSATI will consider problems in National and Federal planning for improved handling of STI within the existing framework of government and non-government efforts in consideration of needs and economic factors.

To this end, COSATI is preparing to undertake a project to contribute to the development of a National policy for handling STI. The availability of a COSATI "blueprint", charting concepts and goals, will facilitate cooperation and participation by government and non-government STI groups. As a related action, a task group to analyze the dissemination of STI through the journal literature was formed.

Echoing a complaint that is still heard two decades later, the report states:

There is a continuing need for widespread understanding of the information systems and activities in existence, both Federal and National. Among users

¹ Committee on Scientific and Technical Information, Federal Council for Science and Technology, Executive Office of the President, Summary Progress Report, dated September 1964, pp 10.

confusion and lack of knowledge exist as to the resources that are actually available or under development. There is need for greater visibility of the various elements of the total system. The National Referral Center for Science and Technology, Library of Congress, continues to make good progress in the development of an inventory of existing information resources. Its first directory will be available in the Fall 1964.

Another outgrowth of the Federal Council's meetings led to the endorsement of the concept of a clearinghouse of Federal STI to provide a single point of contact for government activities in the physical and engineering sciences, thus complementing services now available through the National Library of Medicine and the National Agricultural Library. This places a major responsibility for information dissemination with the Department of Commerce, as previously authorized by Congress in P.L. 776.

A year earlier, the Federal Council had supported the formation of the Office of Standard Reference Data in the National Bureau of Standards. Its current status reported was that it had defined the scope of the System and standards were in the process of being established.

COSATI sponsored an agreement on a standard form for photographic document storage, including the internal and external dimensions of microfiche. Some of these standards were adopted by industry.

Also adopted were standards for the descriptive cataloging of technical reports.

Other task groups were studying the dissemination of information through the journal literature, one working on technical vocabulary compatibility, one is working on conspicuity of STI, another is probing initial distribution of Executive Agency R&D reports

During this period, COSATI was working through a major Operating Committee and a number of ad hoc task groups, which were quickly terminated after completing their assigned tasks.

With the involvement and support of the Office of Science and Technology and the Federal Council for Science and Technology, the year 1964 was notable for the scope and depth of thinking that went into the STI area by Federal authorities. Some of this is revealed in an unpublished document.¹ Carlson was the first Director of Defense Technical Information, who had come to the post from Dupont Corporation, where he was responsible for its technical information program. Carlson was an engineer with considerable knowledge of technical information processes, problems and prospects. His excellent analytical skills were demonstrated in the content of the document that he prepared for General Ely. A few of the highlights of his report are summarized below:

¹ Carlson, Walter M, Draft of Summary Report to Federal Council for Science and Technology, Office of the Secretary of Defense, January 13, 1964. 12 pages. (Carlson was asked to prepare this paper by Lt. General William J. Ely in late 1963, the incoming Chairman of COSI (subsequently COSATI). pp 12. It is only partially related to the formal COSATI Progress Report, 1964) (unpublished)

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Coordination. The first and perhaps most important problem of the government is how to bring about coordinated action among the Federal agencies, between the Executive and Legislative Branches, and on the nation as a whole. The last of these provides the reason why the Federal government must participate in the development of better national STI systems. The government should accent several areas where coordination will make a difference. The problems of organization, administrative responsibility, support through resource allocation and the compatibility of procedures provide chief opportunities for coordination through Federal Council action. Some specific subjects include:

Conspicuity. The importance of improving STI methods needs increased attention throughout the Federal government. Thus, individuals need motivation, managers and administrators need to accept the treatment of information as a resource in decision-making, Congress and the public need to recognize that expenditures for improvements in the handling of information resources can provide a significant increase in the application of science and technology to improve our national defense and to increase our standard of living.

Carlson listed four major problems in making STI conspicuous:

1/ Lack of a method to evaluate benefits obtainable through improvement in the quality of methods for handling STI. 2/ No succinct or comprehensive inventory of existing information resources is available to the government or to the nation. 3/ The Federal and the society STI services have done poorly in communicating to others the scope of information now available or will be made available to them. 4/ There are no incentives for individuals to improve information processing. Technical-trained persons who do get into such activities may suffer financially or in recognition for doing so.

Carlson then addressed the problem of identifying funds used for STI activities in the Federal government and the need to do so to improve management. The problem of definitions needed to be addressed. User studies are either non-existent or inadequate or they serve information handlers rather than users of STI. Changing information technology is creating opportunities and problems. There is now a strong need for the management of R&D in information sciences and better coordination between basic science and systems development in the field. Top management in the public and private sectors need to be much more aware of this problem. There is also the problem of education and training of information handlers and scientists and engineers in the use of information resources. Ways to get high quality in technical writing need attention as does what the proper government role should be in this area.

The Baker report of 1958, Carlson pointed out, had rejected the notion of central control over STI by the Federal government, finding that a decentralized system of separate information systems is far more practical. By the same token, the notion of a single Federal STI system including Executive and Legislative Branch programs does not appear to be meritorious, except for making adjustments here and there. More urgently needed

needed is a system to insure more effective handling of STI stemming from the Executive Branch R&D efforts. The choice for the Executive Branch is to let individual agency systems evolve without central coordination or to require that certain common elements of the agency systems be made compatible through central coordination. Carlson stated that if the uncoordinated approach is chosen, the Executive Branch faces the threat of such coordination being superimposed by Congress.

The Carlson approach towards national system development was that action should be deferred until much more can be learned about needs, scope and economic considerations involved. He preferred to see the identified problems existing within the Executive Branch be brought under control. This course of action resembled the Suttle Report approach that Weinberg objected to in his letter to Jerry Wiesner. Carlson also advocated in his paper to Ely that the Office of Science and Technology assume the leadership for STI programs within the Executive Branch, an approach that was implemented by OST and NSF leaders. He recommended that the FCST request the Bureau of the Budget and the Executive agencies to work with COSI on the development of a uniform budget structure that will identify and make visible the STI activities throughout the government. This subsequently happened. He recommended stronger individual agency STI programs. His paper called for the Federal Council to request the Civil Service Commission to give highest priority to the salary classifications and schedules of scientists and engineers who were engaged in STI efforts.

A summary of COSATI minutes of meetings held in June 1964 reveals other matters that were receiving COSATI attention.¹

An ad hoc task group to define the problem areas in translations was suggested. A letter would be sent by COSATI to the Registrar of Copyrights asking for his views on the stake of the scientific and technical community in the revision of the copyright law and practices. The Task Group on Scientific and Technical Journals was preparing plans for an inventory of scientific and technical journals. The Civil Service Commission was working on a draft to revise librarian and science information standards and schedules. A new task group was recommended to study technology utilization. COSATI was interrogating the agencies

¹ Aines, Andrew A., Minutes of the COSATI Meetings of 17 and 25 June 1964, Committee on Scientific and Technical Information, Federal Council for Science and Technology, Executive Office of the President, Washington, D.C. pp 4. (unpublished)

about their budgets in preparation of a COSATI analysis. BOB, it was announced would be undertaken a special analysis of STI funds in an upcoming budget. NSF provided a review of the Science Information Exchange program and its management.

As the new Executive Secretary of COSATI, the writer was struck by the skill and power of the Chairman of COSATI, General Ely, who as a non-information expert had begun to master the leadership of a function that he had little prior knowledge of, but who was highly intelligent and a quick learner. The members and observers of COSATI reacted favorably to his leadership. Insofar as the members and observers were concerned, it was reassuring to note their vigor, creativeness, and willingness to work. There was no doubt, but the interest of the Congress and the Office of Science and Technology, along with the support of the Federal Council for Science and Technology, contributed to productivity of the COSATI program. For the first time, the top R&D manager of the agency, as a member of FCST, began to understand what was going on in his agency STI program. In monitoring the affairs of COSATI, he was able to understand the nature of the STI operation in his agency and how it contributed to the efficiency and effectiveness of his R&D program. During this period, the STI manager and his staff felt that they were part of the R&D process and reacted accordingly. One of the messages that came through was the costliness of the Federal STI function and the need for gains in management of these programs. At that time, because STI line items were a rarity in agencies, it was impossible to know what the STI function cost. There were rule of the thumb estimates that as much as five to ten percent of the R&D budget was expended on STI, but these were estimates based on conjecture rather than fact.

In 1964, COSATI was directed to make a special analysis of the Executive agencies' STI programs in the President's FY 1966 Budget by the Bureau of the Budget and the Office of Science and Technology. The Federal agencies were asked to cooperate with COSATI in obtaining the required data. Although the COSATI members were involved in the process, it was necessary to get the support of the agency fiscal managers to obtain the data. The Federal STI managers and the various agency budget shops pitched in and assembled the data requested by BOB and OST. The data were assembled and analyzed

and presented in a report to the sponsors and the Federal agencies that provided the input.¹ The Report was a direct descendant of similar analyses published by NSF annually for four years. Because COSATI members were given part of the responsibility in gathering the data, the figures obtained were higher than those received by NSF in its previous annual review of STI activities of the Federal government. In a memorandum to the members of FCST accompanying the report, FCST Chairman, Donald Hornig wrote:

I thank the contributing agencies for their cooperation. COSATI, NSF and BOB are taking steps to eliminate requests for information relating to budgets for information programs, and you will be apprised of the results.

In the Introduction of the Report, he explained further:

An ever-increasing need for more complete budgetary information exists, not only to meet BOB interests, but to assist COSATI and the Federal Council to identify and deal with the budget issues and to project future program and funding requirements.

One reason for the higher figures obtained by COSATI than NSF dealt with a new approach. For the first time the agencies were asked to include cost data about technical information activities related to the complete development cycle up to initial procurement of materiel. The NSF data covered only funding applied to the research function. The change brought difficulties to some agencies in trying to separate STI for research and STI for development. One result was a variety in definitions, hence problems in consistency and quality, since every R&D program differed. In advance of the data-gathering phase, agencies were told that there would be no criticism of their inputs and that it would take several years to collect and analyze data before complete comparability and precision could be obtained. NSF surveys called for four categories of STI, the COSATI effort called for nine. Yet another approach by COSATI was to tell the agencies that they should divide their data into three groups: formal budget items, readily identified items, and estimates. Also of interest was the ratio of STI work done by the agency inhouse and by contractors. Here are some of the findings:

¹ Committee on Scientific and Technical Information, Federal Council for Science and Technology, Special Analysis of the President's FY 1966 Budget for Scientific and Information Programs of Federal Government Agencies, November 1964, PP 31, including Appendices A to K.

A Comparison Between NSF and COSATI Estimates

FY 1966	\$387 million (COSATI)
FY 1965	218 million (NSF)
FY 1964	186 million (NSF)
FY 1963	153 million (NSF)

Data were received from 11 Federal agencies: Agriculture, AEC, Commerce, Defense FAA, HEW, Interior, NASA, NSF, State and VA. The four highest were DOD (\$176 million), HEW (\$62 million), Commerce (\$42 million) and NASA (\$34 million).

Of the three categories of data, estimates accounted for \$481 million, readily identified items for \$46 million and formal budget items for about \$60 million.

In the split between scientific and technical information, the former accounted for \$239 million and the latter \$148 million.

By type of employee performing the STI activity, government personnel accounted for \$175 million and nongovernment personnel was higher at \$212 million.

The breakdown by categories was as follows: publication and distribution (\$132 million), bibliographic and reference (\$79 million), R&D in information sciences, documentation, information systems, techniques and devices (\$58 million), symposia and technical meetings (\$41 million), specialized information centers (\$23 million), management, administration, training in information programs and services (\$21 million), audio/visual and other oral media (\$12 million), translations (\$5 million), and support of publications (\$4 million).

To some of the STI managers, the results of the survey in determining all of the agency STI costs were disappointing. There was a shared feeling that estimates were lower than they should have been. This was the belief of the author of this book who had the task of gathering and analyzing the data. It was openly expressed by some of the STI managers that they feared if the figures were visible, rather than being hidden away, that some effort could be expected of BOB to cut back on funds for STI. There was little or no evidence that BOB was screening the data "to eliminate duplicate requests for information relating to budgets for information programs." At the time the budget analysis was made, there were no information management experts in BOB to mine the agency information. There was no recognition at the time the study was undertaken that there were several Federal agencies or parts thereof that were solely information gathering, handling and disseminating operations. Examples were: weather services, air controller services, USIA, intelligence (STI) services, agricultural extension services, and research library services. It was estimated that only a small part of these costs were presented by agencies involved in these functions. One of the hopes of the COSATI

officers was that STI funding within the agencies would be turned over to the senior STI managers, who would then be fully responsible for all components of their agency STI program management. This did not come to pass in several of the agencies. This was a mistake because it acted as a ceiling on operations within agencies. STI managers had only limited control of their programs, gravitating to the control of the dissemination operation with the passage of time. The more routinized the STI operation became, the more the STI managers began to be regarded only as facility managers. Their involvement with information R&D dwindled. Their involvement with symposia and meetings diminished. The gap between the STI managers and R&D managers and between STI managers and R&D benchworkers widened. All of this was to happen within a decade, but to this observer, the failure to handle the STI budget analysis in a creative way had much to do with subsequent problems.

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For many years, when national leaders have their well-publicized meetings, one of the reliable products that results from their discussions is an agreement to share scientific and technical knowledge. This was true in 1964 as it is today. Curious about what was happening to the agreements and their implementation, the Executive Secretary of COSATI undertook a study that resulted in a review of the area.¹ In making the study, it was thought that all of the agencies, not only the Department of State, should be interrogated about arrangements made to interchange data with other countries. One of the ground rules of the effort was that classified information exchange programs would not be made part of the study. One of the stimulants to undertake the task was a well-defined feeling on the part of Federal information managers that too little thought was given to reciprocity. This suspicion was shared in Congress. Senator Hubert Humphrey bluntly stated: ²

I am personally not at all satisfied with the international exchange of scientific information...Industrialized foreign nations soak up all the information they can get from us--our Government, our industry, and our agriculture. They are less diligent in efforts for reciprocity...

¹ Committee on Scientific and Technical Information, Federal Council for Science and Technology, International Data Exchange Agreements and Arrangements of Agencies of the United States Government, Prepared for the Office of Science and Technology, Executive Office of the President, 1 November 1964, pp. 110, including Appendices A-K.

² Humphrey, Hubert H., Congressional Record, 9 October 1963.

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such little as we do obtain from abroad often does not enter into the mainstream of the Federal pool of information--available to all three military services, as well as to civilian agencies and the national community.

About one year later, Senator Humphrey inserted a joint resolution in Senate (S.J. Res. 202) to establish an agency in the Executive Office of the President, to be known as the President's Advisory Staff on Scientific Information Management.¹ Nothing came of the resolution, except to remind the leaders in the Office of Science and Technology that this was a problem area that needed some attention. What Humphrey wanted was a program to bring the top minds in the country together "in respect to information management and decision -aiding techniques, just as two decades ago we brought together our top scientists to harness the atom." The perspective that he had two decades ago is worth repeating today:

We are all familiar with the cyclical movement of history: the birth, growth, climax, decline and death of past nations and civilizations. Whether the United States of America, having reached a climax of achievement, will not begin the process of decline and death may depend to a great extent on our capacity to assist the responsible decision-makers of Government and industry in assimilating and utilizing our new knowledge to achieve the goals of our democratic society... The close interdependence between social, economic, scientific, technological and political factors is a phenomenon of our new environment. It is a fact which demands new attitudes and requires a partnership for progress between Government and industry, labor and management, agriculture and nonagriculture, public and private institutions, if we are to sustain our position of domestic and international preeminence.

Walter Carlson, Director of Defense Information, addressed the issue at the AGARD Technical Information and Documentation of NATO during the summer of 1963. He discussed the problem of the multiplicity of official channels through which official reports flow, asserting:²

At the present time, we can identify three or four different official or semi-official routes by which American reports are reaching scientists and engineers in the nations of the NATO community. No one of these routes is comprehensive, and each has its own arrangement for return flow of documents from the European nations to the United States.

¹ Humphrey, Hubert H., Congressional Record, 10 September 1964.

² Excerpted from the COSATI Report on International Data Exchange Agreements and Arrangements of Agencies of the U.S. Government, 1 November 1964, p 24.

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He also suggested more international effort to attain uniformity in technical reports and procedures for handling them. Also needed, he pointed out is progress in solving problems of vocabulary, microforms, indexing and mechanization. Moreover, there is a necessity to study what information and data actually flow through the multiple information channels, as he saw it.

In addition to the overlap and multiplicity of information channels, the report found the need for a periodic consolidated list of exchange agreements. COSATI, it recommended, should undertake a project to determine how best to set up such a consolidated list of all formal and informal international agreements and arrangements for the exchange of STI. Information for emerging countries in the Third World must be a concern for the United States. In transmitting STI to such countries, materials that contain overly-sophisticated information beyond the capability of a country to digest and use should be minimal. The Agency for International Development should play a leading role in making the determination and providing assistance to the developing countries. The report also addressed the area of nongovernment data exchange and the need to work out some kind of a satisfactory arrangement so that officials in both the private and public sectors would get more knowledge about problems and issues of interchange through nongovernment channels, especially research information. Bernard Fry, National Science Foundation, authored a paper in 1961, Exchange of Scientific Information Between Foreign Countries and the United States, in which he advocated a clearinghouse for information exchange that would serve both the public and the private sector and develop a vigorous program of acquisition and distribution. In so doing, Fry discounted the capabilities of the Government intelligence agencies to create and maintain such a center. Only in the last couple of years has the National Technical Information Center been authorized to expand its function to gather foreign STI, thus is moving in the direction suggested by Fry and COSATI. The COSATI report also looked at the problems of redundancy and utilization of foreign data. How completely do foreign publications report on R&D work going on in the United States and in their own laboratories? Through what uncoordinated channels, formal and informal, government and private, does STI flow to other countries?

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How thoroughly is STI received from other countries by agencies analyzed, shared and used? Answers to these questions are not available and they should be. The problem of translations was not solved satisfactorily during the 1960s. It still exists in the 1980s with little sign that it will be solved until Americans become more interested in mastering other languages. Translation of foreign documents needed more priority and an organized, uniform dissemination policy was also lacking.

Sixteen recommendations were made for improvement that would, if implemented, result in a more rational and active program. COSATI was called upon to set up a Task Group on International Affairs. It did. The Office of Science and Technology was asked to organize a panel to explore the characteristics of nongovernmental scientific and technical exchange with other countries that would work closely with the COSATI International Task Group. The membership would be largely from the private sector. OST did not. Closer interaction with the intelligence sector was recommended in the gathering of open STI. This did not transpire. The preparation and the maintenance of a consolidated list of agreements and arrangements was a recommendation. This did not happen. There was a recommendation that the Department of State have a clearer role in monitoring the program. For example, it should evaluate the success of STI exchange agreements made by heads of state and other high officials, such as the Secretary of State. It should notify agencies when the political arrangements had been terminated or cooled off. Except in certain high technology and security areas, this has not transpired.

When the study was undertaken in 1964, the Department of State was asked for a list of treaties and arrangements that contained agreements to share STI with other countries. It produced an old document that showed the existence of several thousand agreements of this type, but the science office at the Department of State did not have any information about those that were active or inactive. State may be better prepared to answer questions of this type two decades later, but it is doubtful. The problem is that there is no group in the Federal government with the responsibility for organizing and policy-making in this field. It is hard to believe that a country that spends so many billions on science and technology would neglect such an important need, but the evidence is clear

One of the most successful products resulting from COSATI's activities was the COSATI Subject Category List.¹ The group was chaired by Paul C. Janaske, Department of Commerce, and included: Donald D. Davis (AEC), Ann F. Painter (USDA), Margaret S. Hicks (DOC), Peter Sofchak (DOC), Terry Gillum (DOC), Paul H. Klingbiel (DOD), Peter Olch (DHEW), and Hubert E. Sauter (NASA). The product they prepared is still in wide use in and out of the government.

The List is a uniform subject arrangement for the announcement and distribution of scientific and technical reports which are issued or sponsored by the Executive Branch agencies. It is also of use in R&D management reporting. There are 22 major subject fields and a further division of the fields into 178 groups with scope notes for each of the groups. The two-level arrangement of fields and groups is valuable to users who are able to examine clusters of abstracts, citations and the like in specific areas, including R&D projects, tasks and other work units. The advantages are obvious, as well, for distribution purposes and management reporting.

In subsequent years after its initial issue, agencies such as the Department of Defense extended the list for its purposes as R&D programs continued to grow and with it the need to include new groups and subgroups. As previously mentioned, the COSATI Subject Category List is still being used, but an update is probably required. Unfortunately, the COSATI apparatus, which made the original list possible does not exist and the changes could only come about by cooperative agreement of the leading R&D agencies.

¹ Committee on Scientific and Technical Information, Federal Council for Science and Technology, COSATI Subject Category List, AD 612 200, December 1964, pp 55.

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The concern expressed by Weinberg that the delegated agent approach that was soft-pedaled by Suttle, Carlson and Ely was in jeopardy was not forgotten by Wiesner and his replacement, Dr. Donald Hornig, who followed him early in 1964. In November 1964, a charter for the Task Group on National System(s) for Scientific and Technical Information was proposed and accepted.¹ Two goals and objectives were cited in the Charter:

1/ ...inventory and evaluate the resources (people, libraries and other services, equipment, materials and funds) currently used in national and other domestic STI activities; also ascertain information of users...in and out of the government.

2/ Based on findings, prepare recommendations and plans for the development of a national information system(s) to include actions for government agencies, suggested actions for the private sector, and steps to move from current to advanced information systems.

The Task Group was asked to undertake requisite studies working with representatives of such groups as librarians, abstracting services, commercial publishers and professional societies. It was directed to study user practices and needs, how the technical public assimilates and uses STI, and to identify trends that may bring changes to user patterns. The Charter called for an examination of the total STI system from generators to users and how the system might change in the future. It called on the Task Group to identify and evaluate the many studies and proposals that had been made up to that time. The examination of the pros and cons of central versus decentralized STI systems including their costs and performance was a requirement. It was asked to determine what coordination was required to link ongoing and developing STI systems including international systems, and finally, it was called on to review the state of the art pertaining to equipment, facilities, techniques, organizations, as related to existing and potential national information system(s). Undoubtedly, Weinberg and the PSAC Panel were modified when this development took place.

There were other problems that surfaced during the period. Up to 1964, the National Science Foundation was helping the Office of Critical Tables, National Academy of Sciences

¹ Committee on Scientific and Technical Information, Federal Council for Science and Technology, Charter for the Task Group on National System(s) for Scientific and Technical Information, November 30, 1964, pp 2. (unpublished)

ces, financially, but with the establishment of the National Standard Reference Data System at the National Bureau of Standards, NSF contended that it was now the responsibility of NBS to make the contribution to the Office of Critical Tables. Unfortunately, NBS had not budgeted for the purpose. The problem was solved by Hugh Loweth, Bureau of the Budget, who pointed out to NSF that it had not deleted funds which had been set aside for support of the Office of Critical Tables in its budget. The existence of the Office of Science and Technology, which worked closely with BOB, made it possible to solve this problem smoothly.

Another problem that arose in 1964 resulted from the passage of the Depository Library Act of 1962. The Superintendent of Documents complained he was not receiving the lists of technical reports from the Federal agencies as required by that law. The Office of Science and Technology proposed the preparation of a central index of government publications, including R&D documents, but the Superintendent of Documents contended that this was not GPO's responsibility, although he admitted that funding such an activity was not a problem. At the time, there were about 770 depository libraries, whose number continued to rise weekly. One of the difficulties came from the existence of non-GPO documents that agencies could not mail direct to the libraries because Title 44, Section 95, prohibited the agencies from making mailings to the public. These had to go through SupDocs. The difficulty which has persisted over the years was inevitable because the Joint Committee on Printing of the U.S. Congress has insisted that it should control the printing and binding activities of the Executive Branch agencies, even though such a function had little to do with the primary responsibility of Congress to enact law and to monitor the agencies for fulfillment of the laws they passed. The problem was not the Depository Library Act of 1962; the dissemination of information generated by the government to the public has always been desirable. It should have called on the producing agencies to send the materials to the libraries directly rather than through a Legislative Branch agency. Unfortunately, the problem is still with us, magnified by the Joint Committee on Printing's current effort to seek control of electronic publishing and dissemination. It made no sense in 1962, and does not in 1984.

An interesting issue arose in 1964 about the real purpose of the Science Information Exchange. Was SIE a source of information for scientists who were working in various fields of endeavor? The leaders of SIE strongly believed that this was their basic function. Although some fiscal information was included in the inputs from the various agencies, it was insufficient to be of real use to the managers of R&D programs. The SIE leaders were also aware of the difficulty that faced them if they sought such information from the agencies, recognizing that in a strict sense, although SIE received government funds to operate, it was not a Federal agency as were the Department of Defense, the Atomic Energy Agency and others. From its start, SIE recognized also, that it had to depend on the individual agencies to make a full input of their R&D project information, hence would have to make a strong effort to remain on good terms with them. In the meantime, the agencies were trying to improve their internal R&D management information programs. Dr. Chalmers Sherwin, then in the Office of the Secretary of Defense, was the chairman of a group working hard to establish a standard format for reporting R&D projects. Earlier, the Director of Army Technical Information, Andrew A. Aines, had established an Army panel to upgrade the instrument/^{used for}the Army project-reporting program. Sherwin did not believe that in the slightest way what he was trying to accomplish would be incompatible with what SIE's responsibilities, despite SIE's fears. In essence, he was correct. The SIE product had to derive from each agency's internal R&D management program, not vice versa. ^{There} had to be much more complete and up-to-date data on the agency format and much of this information was not going to be shared with SIE. This is basically why SIE insisted that its clients were scientists and engineers, not the agency R&D managers, except incidently. Congress, on the other hand, expected that SIE would be right on top of the Federal R&D current awareness information program. The Elliott Select Committee on Government Research made it very clear to the Office of Science and Technology of its concern that SIE was not receiving adequate support in the accomplishment of its mission. An internal OST memorandum¹ discussing meetings held with Chalmers Sherwin indicated an understanding that: 1/ If SIE handles

¹ Office of Science and Technology, Internal Memorandum prepared by Jay H. Kelley, dated 1 July 1964, pp 2.

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management information, it should be classified; 2/ Even though SIE considers its primary service for scientists, OST regards SIE primarily as a tool for management; 3/ If the Sherwin project-reporting program is successful, the data it produces should be considered for agency use or for a central government-wide store. It was also Kelley's view that more thought had to be given to SIE as a mechanism for interagency coordination.¹ He wrote that SIE had been thoroughly discussed at a COSATI meeting held on 25 June 1964: its coverage in the physical as well as the life sciences, if it should continue to be part of the Smithsonian Institution or transferred to the DDC Clearinghouse; and when the agencies could start sending SIE data dealing with technology.

One of the vigorous programs of the Reagan Administration, exercised through the Office of Management and Budget, is the reduction of agency publications. What has not been advertised at the outset of this campaign is the fact that such campaigns are not new. This is seen in an internal OST memorandum prepared by Kelley in 1964.² Kelley wrote:

According to some old hands, a Presidential move to curtail publications is a recurring measure and should be considered a normal thing. It was last done in 1947...The feeling that there is too much publication by the agencies is broadly held by the President's advisors (and the President). The curtailment (unlike the campaign in 1982-84) is not necessarily aimed at reducing expenditures but rather to improve the efficiency of those who receive a great volume of these publications..., including the fields of science and technology...Reduction can be done through consolidations rather than through the elimination of publications (according to Presidential spokesmen).

A BOB policymaker, Roger Jones, says that there is not enough scientific and technical publication by the departments and agencies, (hence) BOB will give highest priority to the preservation of publications in science and technology.

While the target seemed to be handouts and fliers, STI documents were not cordoned off.

One of the OST technical assistants, William C. Ackermann was asked to sit on a US Department of Agriculture board set up for the purpose of screening. Non-government generators of information, such as R&D contractors were absolved from the process.

¹ Office of Science and Technology, Internal Memorandum prepared by Jay H. Kelley, 25 June 1964, 1 page.

² Office of Science and Technology, Memorandum J. J. Kelley to Colin MacLeod, Deputy Director, OST, Presidential Request for Agency Publications Curtailment, Feb. 7, 1964, 2 pages

The involvement of the President was made clear. Kelley wrote:

At the January 17, 1964 Cabinet meeting, President Johnson requested that the agencies survey their own publications with a view to cutting back and consolidating the number of publications currently being issued. He asked that the agencies submit a list of these publications which are to be eliminated by the following Friday, January 24, 1964. William D. Carey, Bureau of the Budget, was assigned the task of coordinating this activity; and in turn, Roger Jones was designated the focal point for collecting submissions from the agencies.

While the purpose of the exercise in 1964 was to reduce paperwork drain on the recipients for the most part, based on occasional Administration events in the 1982-1983 period, the purpose is primarily to affect savings in dollars to the taxpayers. In 1964, there was an Office of Science and Technology to make sure that Federal STI was not included in the publications to be eliminated; in 1982, the Office of Science and Technology Policy made no overt effort to intervene with the Office of Management and Budget to protect Federal STI. Even "laymanized" technical information in the form of consumer information could not escape the talons of OMB. During this period, disturbing evidence that the flow of useful information to the public is not regarded as a high priority in the "Age of Information."

The involvement of President Lyndon B. Johnson in the campaign to improve Federal STI programs, on the other hand, is evidenced in an extract from Dr. Hornig's testimony before the House Appropriations Subcommittee in 1964, asking for additional personnel for STI and energy work in OST.

The first (of the two functions) is to assist him in the planning, development and coordination of means for handling STI. This is a large job. The Federal government currently invests over a half billion dollars a year in activities to make STI easily available. In addition, provision of STI is the function of a large private industry composed of publishing houses, abstracting services, translating services and information services financed within companies. More than \$1 billion a year is spent for the product of this industry. In spite of its strengths, the combined public-private system for handling data has serious weaknesses. Its capacity to handle data is falling behind our capacity to produce data.

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Addressing the problem in more depth, Hornig went on to explain:

While the principle of decentralization is sound, it is accompanied by problems that are becoming serious. There is a great deal of needless duplication --for example, multiple abstracting of the same scientific article. There are gaps, such as the failure to abstract findings in some fields. Costs are high and rising. The net consequences of those deficiencies is to create barriers to improved industrial efficiency, to innovation and to the effectiveness of research. The potential gains from increased investments in the solution of such problems are high. The nation spends \$22 billion per year on R&D and every increase of one percent in the efficiency of this process is worth \$220 million per year.

Following the lead of his predecessor, Jerry Wiesner, in accepting the responsibility for action in his office, Hornig added:

There is no place in the government outside the Executive Office of the President where these problems can be considered as a whole, where the total activities of government can be assessed in relation to the activities of private industry, or where policy with respect to essential common specifications for information systems can be set. The Office of Science and Technology will engage only in the minimum core of work relating to policy, overall planning and ratification of standards. Everything else will be done outside the Executive Office. We plan on carrying out these central functions with four professional people, plus secretarial support.

Unable to get all of the spaces added on to the OST authorization, Hornig wrote to the members of FCST: ¹

...there will be a need for more manpower and funds than are presently available to COSATI to provide us with the product we need. I fully expect that as the tempo of the effort increases and additional need for resources unfold, the Federal agencies will give their support by providing their most capable personnel and sufficient funds to help underwrite a coherent and perceptive program. I am confident I can count on you to join me in attaining this objective.

At the peak of the OST-COSATI effort, there were four professionals and two secretaries involved in STI activities. Since at no time did OST provide more than two of its own spaces for one professional and one secretary, it is evident that the members agencies of FCST responded favorably to the request of the President's science Advisor. Hornig's commitment

¹ Hornig, Donald F., Memorandum to the Members, Federal Council for Science and Technology, March 15, 1964, pp 2. (unpublished)

and understanding of the problems and the opportunities inherent in a strong national STI program, difficult though it might be to achieve, were inspirational at the time and a fond memory today.

Perhaps, not enough credit has been given to Jay Kelley¹ for his contributions during the 1963-1964 period to the development of the Federal STI program. More of a scholar than a policymaker, he nevertheless was instrumental during the pre-Knox days at OST in stirring a small flame into a much larger blaze. Not being an information expert primarily and highly skilled in government management secondarily, Kelley was hardly prepared for the explosion of effort that was manifest in 1963 and 1964. But as the Congressional and Executive Office of the President STI tide swept in, the only person in OST who was keeping an oar in the water was Kelley. Early in 1964, Kelley painted a word picture about the STI area in a report to the President, which is abstracted below: ¹

The problem of ensuring the timely communication of technical information has become increasingly complex with the growth of the Federal effort in R&D, giving rise to a feeling in both the scientific community and the Congress that present efforts are inadequate. While the OST has opposed the establishment of costly and untried innovations in information systems until feasibility is clearly demonstrated, the OST, working through the Federal Council, is establishing policy guidance for improving the flow of scientific information....Although the second PSAC Panel report "Science, Government, and Information," devoted considerable attention to apprising scientists and engineers to improve their own habits in communicating scientific results, it made many specific recommendations to government agencies and to the President for improving the handling of Federal science information facilities and the support of worthy non-Federal facilities and services. The report rejected the idea of a single national information-processing and distribution center as inconsistent with the pluralistic nature of American society... More recently, OST consultant groups have stressed the need for stronger bibliographic control of scientific and technical literature. These and a host of other recommendations received from Panels and advisors from outside the government, have stimulated actual changes in the organization

¹ Kelley, J. Hilary, Scientific Information, a section to be included in the Report to the President, 26 March 1964, pp 4. (unpublished)

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and methodology for coping with this growing problem in STI. The most significant of these changes was the establishment of Agency and OST focal points for scientific information, giving visibility to science information throughout the government. At the same time, these focal points were brought together to form the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology (FCST).

Kelley pointed out that in its short history, COSATI

has registered a number of improvements, most of which respond to policy guidelines previously. Among these are the setting of uniform standards for R&D documents such as microforms and descriptive cataloging and indexing, and the centering of these bibliographic control efforts in the Department of Commerce. It assisted OST in establishing the National Standard Reference Data System at the National Bureau of Standards, securing for it over \$1 million of new money for the compilation of physical constants and the organizing of these compilations with the existing compilations into a coherent tool for scientists and engineers.

Actions such as these, he stated,

along with the designation of the Department of Health, Education, and Welfare as the focal point for research information on air pollution, indicate a growing trend toward the "delegated agent concept" by which information responsibilities of a specific kind are assumed by one agency for the whole government. This was one of the major recommendations of the Weinberg Report.

He went on to explain that

in many cases, the policies of OST pervade throughout the government so that these same policies become accepted by the individual agencies and departments as policy guidelines for their own improvements in handling STI. For example, DOD has embraced the specialized information center (recommended by the Weinberg Panel) and has designated over 40 such centers as being qualified for serving DOD generally and in some cases the entire government.

As his final entry, he addressed the problem of reporting current Federal R&D projects, as follows:

OST and COSATI have taken a special interest in the Science Information Exchange, which by Federal Council action in 1963, was strengthened organizationally by being transferred from a position of interagency sponsorship to the full funding and management of NSF. The SIE collects the listing of current R&F projects from the science-oriented agencies to assist the submitting agencies in planning more coordinated science programs. Formed first as an inventory of projects in the biomedical field, it has more recently been extended to include the physical sciences and should serve to alert agency project officials of work in other agencies similar to their own.

This statement made by Kelley, not only paints a picture of the progress that was taking place in OST and COSATI, as well as in the Federal agencies, it underscores that with the establishment of the focal points in OST and in the Federal agencies, accomplishments, not otherwise achievable, were becoming commonplace. Unfortunately, the institutionalization process would become unravelled in the early 1970s. Nevertheless, the history

of Federal STI since World War II would be incomplete without the recognition of the stimulating role played by Kelley during the "early days."

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